

NASA SBIR/STTR Technologies

A4.01-8847 - Optical Mach Probe

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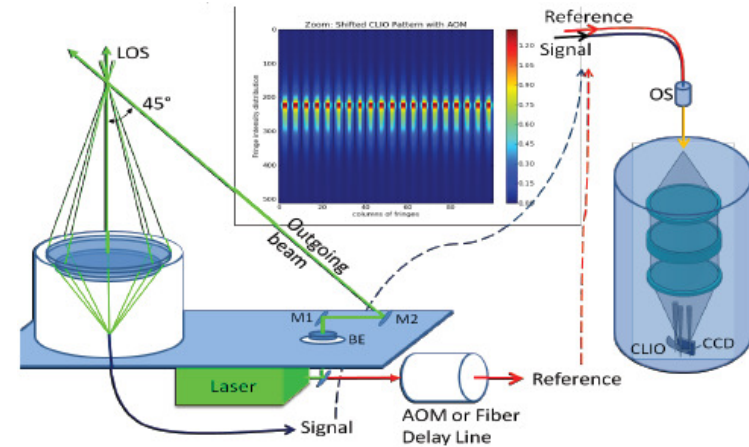
Michigan Aerospace Corporation- Ann Arbor, MI



Identification and Significance of Innovation

Nonintrusive diagnostics techniques capable of simultaneously obtaining multiple fluid properties are critical for aerospace testing of flows about vehicles, components, and structures as well as for use in basic fluid mechanical research. Michigan Aerospace Corporation (MAC) proposes to design and build a Fabry-Perot (FP) based interferometer that would provide simultaneous measurements for velocity, temperature, and flow density in high speed flows. In addition, these measurements would provide higher accuracy and higher sample rates than the current state-of-the-art.

Expected TRL Range at the end of Contract (3):



Technical Objectives and Work Plan

1. A requirements analysis to determine the needs of the instrument and its specific optical configurations
2. Performed optical, electrical, and mechanical design and simulation of a prototype instrument
3. Performed trade studies for various architecture and inversion strategies

NASA Applications

The proposed instrument will be useful at aerospace ground and flight research support facilities for characterizing and understanding of the complex flow behavior in terms of flow quality, turbulence intensity, and Mach number measured up to and including hypersonic speed regimes. The probe also could be used for on-board monitoring of propulsion processes as well as in aiding the development of new computational models. Detecting and studying atmospheric turbulence will also be possible.

Non-NASA Applications

Other organizations (US Air Force, US Navy, etc.) and prime contractors will have similar uses for this technology. Commercial and military aircraft turbulence warning with optical air data system capability

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NON-PROPRIETARY DATA